

The Minuteman

Official Newsletter of the Minuteman Repeater Association

Volume 23 #4, March/April 1994

The President's Corner

Andy Morrison, N1BHI

So far, we have put the IFR 1000S to good use. It's been used at Weston and Slygo - it sure is nice to have the right test equipment available when setting levels, aligning receivers and tuning up transmitters. We've already been asked by another Ham club to help with their system; we want to be sure that people understand that we are willing to assist other repeater groups when possible.

The MMRA Technical Information Net is gradually picking up more regular check-ins. We hope that the net becomes a major source of club information, and an effective forum for the exchange of technical knowledge and expertise. Net control operators include myself, N1HBR, N1NVK, N1NVL and WA1HAI. Anyone else interested in taking the net is welcome to do so; just get on with us on a Tuesday night at 2000 Hours local and volunteer.

The March meeting will feature and presentation by Father Jim McCaffrey, K1TTY, on how siesomographs work and a tour of the Weston Observatory Siesomgraphic facility. It should be interesting - something even a Ham's wife might find worth her time. The membership meeting is the week before, on March 15, at the Campion Center at 7:30. I'm looking forward to seeing you there...and don't forget - we need help on March 20 at the Flea Market!

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Items of Interest

MMRA Flea Market

Sunday March 20th at the Westboro High School

Vendors set up starting at 8:00am

Buyers enter at 10:00am

Admission \$2.00

MMRA General Meeting Tues March 15

(beware the Ides of March)

Marlboro VE Team Session Sat April 9

Marlboro Public Library 9:00am.

Contact KD1GG for reservations.

The Repeater Report

Chris Conti, N1NVL - Technical Director, MMRA

146.610 N1BHI/R Marlborough, MA

Some software updates were done by Andy N1BHI and no problems were noted.

146.820 KA1AL/R Weston, MA

Work continues on the link radio, Bryan KA1YQB made modifications to the reciver The "crew" Andy N1BHI, Walter N1HBR, Clark N1NVK, Chris N1NVL completed the wiring needed for the two repeater and one link radio set-up. This should wrap up work at Weston for a while. Some of the crew was even heard going home from the site at 1 a.m. after a final successful re-work of the interface and a complete test of the link function. Software is now being re-written to accomodate the user codes. If you are a current member of the MMRA we hope to have an insert in the next letter with an up-date of features and codes now available to users.

146.715 N1NVL/R Stoneham, MA

Interference of a new kind pops up on the roof.... a new commercial station went on the air and we soon started hearing another repeater on 220mhz getting into the 2-meter machine, the problem was in an intermodulation mix between this 220 machine and the commercial unit in the 460Mhz band, the owner of the new station was

contacted and has been very co-operative in helping to solve the problem including spending \$600 of thier own money to put additional filtering on thier station. Thanks to Clark N1NVK for his help and Dick KA1TUZ for helping with frequency listings and finding the right people! As soon as experiments are complete at the Weston,MA site, this repeater will be upgraded to be linked part time.

224.400 N1BHI/R Quincy, MA

Kerchunk Kerchunk - Now being investigated on this machine - hoping to get it back and linked in to the network soon. The machine was brought to the shop on 1/22 to try and run it on the bench. This repeater returned to service and immediately failed, oh well. Then in stepped Bill N1KUG who offered to do some work with the tech crew, he took the repeater to his home and is running tests to find that nasty intermittent. Also thanks to Andy N1BHI for pulling my car out of the snow after like a dummy I tried to follow his 4 wheel drive up the snow covered road. (and I almost made it too!).

146.670 KA1HKP/R Quincy, MA

On Saturday 01/22/94 a crew of Mike KA1HKP, Andy N1BHI, Walter N1HBR, and Chris N1NVL went up to evaluate all that is needed for the upcoming rebuild of the repeater. The "Hero of the day" award goes to Mike KA1HKP who arrived first and had to cross the frozen field, over giant hills of snow and ice then dug out the door chipping away at the ice with his now ruined pocket knife! Access to this site is difficult and climbing the tower is out of the question until spring.

We are looking to Spring for the rebuild of the entire system. This rebuild will include a New SCOM 7k Controller w/autopatch and voice prompts, an interface built by Walter N1HBR to facilitate interconnect, New hardline, and replacement antenna. Also a 5 foot tall 19 inch equipment rack at the site will facilitate easier maintainence and complete shielded enclosure, along with this plans are underway to heat and/or cool the cabinet for a more stable temprature environment. If you want to picture the Quincy site and its associated equipment room, just look at a phone booth and cut the space in half! Other possibilities include better filtering and battery Back-up - we expect to be spending \$800-\$1000 on much needed improvements to this site. Interested in helping improve the Quincy site ? There are many projects comming up, driving ground rods, running lines, prep work and installation in rack, etc. Let your talents be known! - Call my voice mail at (508) 489-1426 or the MMRA Hot line at (508) 489-2282.

224.700 N1HBR/R Weston, MA

A new SCOM 5K controller was ordered to facilitate linking and standardize control. The controler was installed on 1/22 with project completion on 1/24 which included an entire rerack, rewire, connectorize, and new power connections.

223.940 N1BHI/R Hopkington, MA

Andy N1BHI is continuing work on this machine and it's expected to return to full service shortly with a full time link (that you can actually hear!)

446.725 N1NVK/R Stoneham, MA

As soon as experiments are complete at the Weston,MA site, this repeater will be linked full time. Audio levels have been reset and work was done to try to stabilize the audio. Yes, we do know about the funny squeal the repeater makes, but are still unsure of the fix. If you have seen this problem in a Hamtronics UHF Exciter and have a solution, Please let us know!

449.925 N1HBR/R Marlborough, MA

An oven Made by Bryan KA1YQB was installed to help stabilize frequency, Walter N1HBR then modified the design further using the bottom out of one of the many empty cups from coffee consumed by the crew.

145.030 KA1OUI-3 Node

No news is good news.



Bob Levine, KD1GG

Finally the end of Winter is in sight. Time to think about new antenna erections and repairs/modifications to existing antennas after a tough snow and ice season. Spring is the most exciting season for radio related activites. The flea market season is underway and plans for Field Day, Rochester, and of course - DAYTON must begin.

I would be interested in compiling a list of MMRA members planning on making the trek to Dayton. Maybe we could all get together for a few apres-flea drinks. Let me know and we can establish a sked. If you haven't been to Dayton, consider going. By the time you read this, you will have a real tough time getting local accomodations, but you can get a room within reasonable driving distances. How big is Dayton? Last year there were almost 3,000 tables. There are about 4 indoor rooms (gymnasium size) where all kinds of vendors are displaying good stuff. Dayton has become the popular place for new product introductions. Besides the flea

market and vendor area, there are forums on almost every aspect of Ham radio. Last year I served on the Hamvention Committee along with WA1W and we also served as VE's for an exam session.

If you are considering the drive, it is almost exactly 800 miles to the Hamvention site. It takes about 16 hours +/- to drive straight through plus any time you spend off-road at restaurants etc... Leave here around 3-4 am and you can be rolling into your Dayton hotel before sunset.

Before your engine even gets a chance to cool off after Dayton, Rochester will be here. If you can't make Dayton, consider a day at the fairgrounds. Sure, the usual assortment of overpriced boat anchors will abound, but the socializing is great.

Joe KC1D Pete KI1M Nancy N1CXC

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Not Just for the Old Buzzards

Mark Wilkins, AA1IA - Official MMRA Old Buzzard

Seems to always be that a lot of discussion and numerous articles about all the modes that we amateurs enjoy. Be it SSB, FM, CW, RTTY and the rest. I like them all, but I'd like to rattle your cage about the somewhat forgotten mode of AM, which incidentally is my mode of choice.

I still can't figure out why the mode draws me like a magnet, maybe it has got something to do with fidelity, or maybe it is the infamous 10 or 20 minutes of key downs or could be those wide, wide signals that seem to be the source of of many a SSB'ers complaint, I JUST DON'T KNOW. (explains the length of this sentence too - ed) Can't say I really know much at all about about a hobby that I haven't been in a year but safely say that I've never met a more friendly (most of the time) helpful and quick-witted (some of the time) bunch of hams since I've been on AM. Must be that eccentric personna that seems to be a requirement for all us hams, including the AM'ers.

Guess the reason AM works for me is not just the mystique of it all but that it has forced me to learn the mysterious inner workings of my rig, which happens to be a remnant of times past. The old YEASU FT 101E. See, the rig sounded like what it was, stock and "yellowish", and it just wouldn't due, so with a little detective work and a lot of questions I tracked down some modifications from up near "SCOWTOWN" someplace north of here and

proceeded to RIP the old YAAZZU apart. (Note: all of you "fine biz old man" elmers out there that are snorting a chuckle or two, keep it down, you knew hardly nothing at all about radio once too!!). Just me thinking of tearing into the only HF rig I had is giving me the chills, but there I was, full steam ahead, armed with my trusty fully heated Weller 30 watter and absolutely no idea of what I was doing, it was quite an adrelalin rush to say the least. I managed to screw up pretty good before I got it right, but isn't that what it's all about. I am sure we've all screwed up in the past (ayyyy elmer?). The rig emerged about three weeks later with what I lovingly call "FAT BOY AUDIO". You HARLEY owners know what I'm talkin' bout and since the mod whenever I get an audio check it's usually a good one and that is the stuff that smiles are made of.

One last thing. I'd like to point out that from what I gather, the ranks of AM'ers has been growing steadily for a while. The majority of hams I work with are ten years either way of thirtysomethings, which I am a member of.

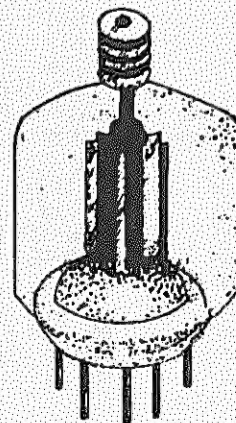
Finally, it all seems to me the general feeling among the AM'ers is one of preservation of "Born in the U.S.A.", classic vintage, Heavy Iron Rigs. They certainly sound good, but that leaves my old Yeasu 101 out but I guess you've got to roll with what you've got, so I do.

So don't forget to bust out that old 1954 Ranger-one that is sucking up dust in the back of the attic and try AM; again. If you don't, then toss that old boat anchor my way. See you on 3885.

For Sale:

Kenwood 520SE Transceiver in Excellent condition. Complete with microphone and I'll even throw in a mini-beam with rotor. An outstanding offer for only \$300. Drake matchbos, which will work well with the Kenwood 520SE, seperately priced at \$25. BNC coax antenna switch and rotor-control box prices negotiable. Please call Joel, K1JTY after 6pm or leave a message during the day at (508) 588-6716.

Can you name that tube?



MMRA Roster as of 2/14/93

NF1A Arthur E. Pizer	WA1GBN Donald R. Taranto	N1LPZ Andrew Black	KD1T Rudolph M. Stucchi
WB1AAT Michael Ryan	WB1GCQ John J. O'Shea	N1LUM David N. Spalding	KD1TA Carolann
KD1AC Frank J. Caci	KD1GD James Elgin	KD1LV Reid A. Squier	B. Montgomery
KD1AD Sue Caci	W1GE Harold Ward	KB1LY Joseph R. Smulowicz	W1TCD Carter P. Pfaelzer
N1AJK Edward D. Ostroff	KD1GG Bob Levine	K1MCH Glenn Gustavson	K1TCV Roger N. Tessier
KA1AL Alan E. Kunian	K1GHT James M. Jacobs	WA1MDO Tom Porada	KA1TKZ Kendell C. Uloth
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WB1APS Kenneth Taylor	WB1GMA Thomas L. Qualtieri	N1MLP Diane Grossman	KA1TQS Zovig Mooradian
K1AUQ Russell W. Dearborn	K1GOI Gerald A. Horne	N1MLQ Eric Mabie	KA1TUZ Richard C. Doherty
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K1BAF Aaron Fishman	N1GTB Elaine R. Chase	N1MLV Rose Wade	NN1U A. Paolantonio
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WA1BGP John K. Ross	N1GXY Bob Smith	KO1N Irving Geller	WA1UGW James E. Shepherd
N1BHI Andrew L. Morrison	WA1HAI Joseph W. Weiss	NC1N Charles H. Ross	K1UKM Irving C. Davis
W1BJS Elmer M. Goldman	N1HBR Walter S. Ching	WE1N Francis W. Kaseta	K1UPY Philip Henneberry
WB1BUZ Joseph M. Garfield	WA1HEX Steve Campbell	K1NDF Neal Lipson	KA1USL Lee J. Gartenberg
WB1BVA Frances B. Garfield	W1HIT Arthur A. Davis	N1NJD Edward J. Buckley	K1UVD Joe Aversa
N1BZT Victoria C. Duffy	W1HIV Patrick Harris	KA1NLD Lynne M. Ausman	WA1UVR John Morrison
WB1C Charles R. Mapps	K1HK Harold S. Kost	N1NOM Horace E. Mulhern	NU1V Eric E. Hahn
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WA1CFX Howard L. Mintz	K1HLZ Alan Carp	N1NQR Stephen C. Cohn	KA1VMC Chris Talbot
K1CG George Manning	KD1HN William W. Wilder	N1NVK Clark Conti	WA1VWE Carl Turnquist
K1CHY Irwin C. Stone	KB1HO Ruff Read III	N1NVL Chris Conti	K1VZI Lee Richard Herterich
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W1CMR Robert W. Wilmarth	N1HUF Barry M. Glassman	W1NWI William H. Hurd	WA1WIS Jay I. W. Moskow
K1COS Lloyd W. Locke	N1HYX Donald J. O'Shea	N1NWY Daniel P. Olsen	K1WIX Carl Eric Ellingson
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N1CW Ray Shoop	N1IJL Edward A. Lee	N1OCN Carole A. Smith	KT1X David H. Croll
AG1D Dale A. Zeskind	K1IJZ William R. Wade	N1OCS Joe Rich	W1YHY Lance O. Hobson
WA1DCL Bruce Stacey	KA1INO Richard C. Simonson	K1ODW Robert W. Smith	WA1YMD Robert F. Dugas
W1DDO Robert Ruplenas	N1INY Herbert R. Driscoll	N1OFX Robert Jack	W1YPC Gerald M. MacNabb
N1DDU Jim Walsh	N1IUR Edwin B. Merrick	N1OHL Edward J. Buckley Jr.	KA1YQB Bryan H. Cerqua
N1DDW Deborah Mullen	N1IUY Armand R. Francoeur	N1OIL Paul Hopkins	KC1YR Sharon M. Gartenberg
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KA1DPW David Goldblatt	N1IAH John J. McCarthy	K1PBL Robert M. Fraser	KA1ZOV Ralph N. Dean
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WA1DXI Paul J. Planchet	K1JHT David T. Sanderson	WA1PNZ Louis R. Raneri	N2IOF Charles Read
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See p.9

Minuteman Repeater Association, Inc.
P. O. Box 2282
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Voice Mailbox:(508) 489-2282.

A Non-Profit Communications Organization Serving the Public in Time of Emergency.

-Application for Membership-

- ☐ *New* or ☐ *Renewal*
☐ *Individual Membership (Dues \$25 per year)* ☐ *Family Membership (Dues: \$35 per year)*
☐ *Novice Membership (1st year dues: \$10)*

I hereby apply for Membership in the MINUTEMAN REPEATER ASSOCIATION, INC. I agree to abide by the rules and regulations of the Association as stated in the By-Laws, and understand that acceptance of this application entitles me to all rights and privileges of membership as provided under the By-Laws.

Signature: _____ Date: _____

Name: _____ Callsign: _____ Class of Lic: _____

Home Address: _____

Work Address: _____
 Work Phone#: _____

Member of: ARRL? _____ Other Clubs? _____

Equipment Available for Your Use:

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VHF	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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I can and am willing to assist/serve the Association an/or help maintain the Repeaters in the following ways (check all appropriate boxes)

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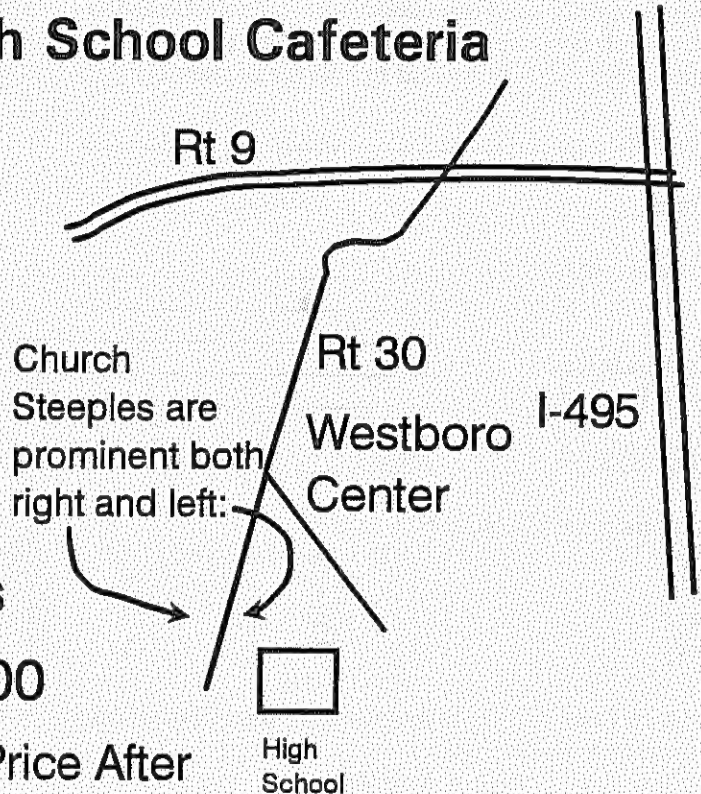
PO Box 2282
Lexington, MA 02173

Amateur Radio
Flea Market
Minuteman Repeater Association

Sunday, March 20, 1994

Location: Westboro High School Cafeteria

From I-495 take Rt 9 West to Rt 30 West into Westboro Center. At Intersection of Rt 135 go as straight as possible, staying on Rt 30. High School is on left about 1/4 mile. Watch for Churches both right and left. H.S. is just after Churches on Left.



Admission: \$2.00 for buyers

Vendors: 0800 Buyers: 1000

Table Size	Price B4 Mar 10	Price After
5 feet	\$7.50	\$12.00
8 feet	\$12.00	\$18.00
10 feet	\$15.00	\$22.00
Floor-Max 8 feet	\$5.00	\$8.00

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Session
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Send Table Order to:

MMRA
P.O. Box 2282
Lexington, MA 02173

For Info call:

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Talkin - 146.61, 146.82, 449.925, 223.94, 224.7

THE PUZZLE CORNER

F. P. Morrison, KB1FZ

The Puzzle Corner is a new feature of the MMRA Newsletter, started with the thought that there are many of you who might enjoy exercising logical and mathematical skills on an occasional brain-teaser. The problems and questions we expect to pose generally will not require any higher math, but will require a degree of insight into algebraic, logical, geometrical, and other mathematical and analytical concepts.

Those of you who are sufficiently interested and intrigued by these questions are invited to send their solutions to the writer via the Lexington Post Office Box 2282. Successful solutions will be acknowledged in this column in the Newsletter following their receipt, and correct solutions will also be published therein. Also, those of you who may have their own problems to test our abilities are invited to send them to the writer for publication in this column.

The first question for the Puzzle Corner shows the interesting result that $1 = 2$, and goes as follows:

Given that $a = b$, then $ab = a^2$. Therefore $ab - b^2 = a^2 - b^2$; therefore $b(a - b) = (a + b)(a - b)$; therefore $b = a + b$; therefore $b = 2b$; therefore $1 = 2$. Can you find the fallacy?

The second problem is:

A room is 30 feet long, 12 feet wide, and 12 feet high. On the middle line of one of the smaller side walls and 1 foot from the ceiling is a wasp. On the middle line of the opposite wall and 11 feet from the ceiling is a fly. The wasp catches the fly by crawling all the way to it: the fly, paralyzed by fear, remains still. What is the length of the shortest route that the wasp can follow to reach the fly?

The third problem involves some logical reasoning:

At a fork in the road, there are two houses. One is occupied by a family which is known to tell the truth at all times, and the other is occupied by a family which is known to lie at all times. A traveler comes to the fork in the road, and finds standing there two men, one from each family, but with no way of telling which is which. Wishing to ask which fork to take to get to his destination, and not wanting false directions, he can ask one (1) question of each person; the questions must admit of only a yes or no answer. What two questions must he ask in order to be sure of getting the correct information?

Good luck with your solutions. Correct answers will be in the next Newsletter.

Theory of On-Glass Mobil Antennas

Gary Coffman KE4ZV

On-glass antennas are fed at a voltage node by a capacitive coupling made up of the antenna foot, the auto glass, and a small box attached to the inner side of the glass. Now to have the antenna end be a voltage node, the antenna has to be an even multiple of $1/4$ wave electrically at the frequency of interest. This is usually done with a physical halfwave rod which also has the charm that it doesn't require a groundplane to function properly. Since the auto glass isn't well characterized, and every individual installation is likely to be different, the inner box usually has an adjustment to vary the capacitance for a particular installation. This is usually a "flapper" capacitor bent closer or further from the glass with a nylon cam. The antenna rod is usually slightly longer than a halfwave so it can be shortened by the capacitance to resonance, a series LC circuit.

Now since this is a high impedance point, we'd normally expect the tuning to be quite sharp, but it usually isn't. In trying to find out why not, we discover one of the problem areas of on-glass antennas. That's the usually poor decoupling of the coax shield from the antenna currents. This results in a hot shield, RF in the cabin, and a poor resultant antenna pattern. The reason there is poor decoupling is that the "matchbox" is equipped with a wire and little metal tab that's supposed to "ground" the shield to the auto body. Unfortunately, this doesn't do much good. That's because (1) we're using an antenna that doesn't work against ground so this isn't a virtual short at VHF/UHF, and (2) because the radio usually isn't well grounded to the body either in today's plastic dash cars so that the return likely is via the power wiring to the battery and then to the body. So we've got a nasty ground loop that includes the coax shield and the window frame. The resultant antenna pattern is unlikely to be omni, unlikely to have its major lobe in the horizontal plane, and certainly will have less gain than a $5/8$ wave antenna mounted securely through the center of the top.

The other concern with on-glass antennas is physical. They do tend to fall off or get knocked off more frequently than a thru-hole mounted antenna. As an example of both problems, I was using an Avanti on-glass antenna on 2 meters in a Chevy Monza. One night as I was driving down the interstate the rod fell off. I didn't notice, and the fellows with whom I was talking didn't notice. That's because the coax in the cabin continued to be the primary radiator. Note that the dashboard tach always noticed when I was transmitting by jumping to 6000 RPM any time I keyed down, whether the rod was in place or not.

As usual, your mileage may vary, but I'm not going to bother with on-glass ham antennas anymore. I either drill the hole, or use a magmount expedient.

Examination and Upgrading News

Bob Levine KD1GG

The Marlboro VE Team continues to schedule examination sessions monthly at the Marlboro Public Library. Unfortunately, Mother Nature has forced us to cancel the last two sessions. Our VE Sessions are still scheduled for the **SECOND SATURDAY** of every month. The Marlboro Public Library is located at the west end of Main Street in Marlboro. For exact directions and to sign up for a session, please contact me at (508) 485-7006. The April session is scheduled for April 9th and the May session is on May 14th. Upgrade to take advantage to the lower (and more active) sections of the HF bands!

MMRA Fox Hunts

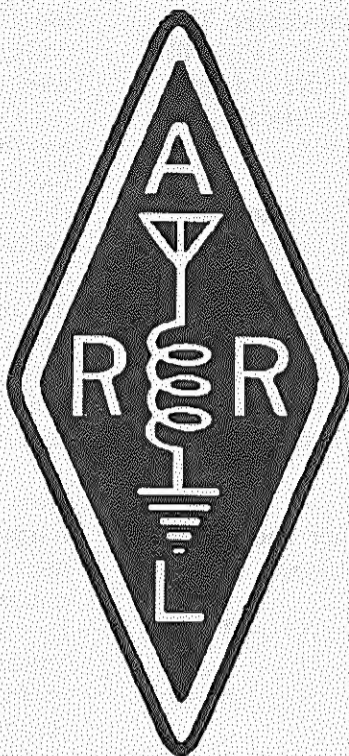
Clark Conti, N1NVK

Fox hunts will begin every Saturday morning at 10:00 AM and run till noon. The rules will be kept to a minimum. The fox will transmit into one of the MMRA 2 meter repeaters. This is to simulate a jammer or unlicensed user for us to hunt down. We will change repeaters each week, so that there will be a hunt in each repeater region about once a month. The fox will be in

plain sight, and will transmit for at least 30 seconds every 5 minutes without using silly tricks like hiding in underground bunkers, using circular polarity, etc. Hunters will be allowed to use whatever means available to them to track down the beast, including teams, soliciting beam headings from friends at home,

fancy expensive equipment ... **WHATEVER IS LEGAL** under the FCC rules and traffic laws. Anyone can participate. You do not need to be a MMRA member or even a licensed ham to have fun with radio DFing, so bring your friends and family, or anyone who shows an interest. (What the heck, we'll even let the civil air patrol guys play.) Of course anyone who hunts does so at their own risk, the club cannot be responsible for your actions, let's be grownups, OK? There is no entry fee, no registration, no reservations, and **NO PRIZES**. First one to find the fox wins, and gets the honor of being the fox for the next hunt. If nobody finds the fox before 12:00, he goes back into hiding until the next Saturday. Location for each week will be announced on the regular Tuesday night net, but if you miss that, call the club hotline, or just ask around on the repeaters.

REMEMBER... The goal here is to have a little FUN, so get your gear together for next Saturday morning and good luck!



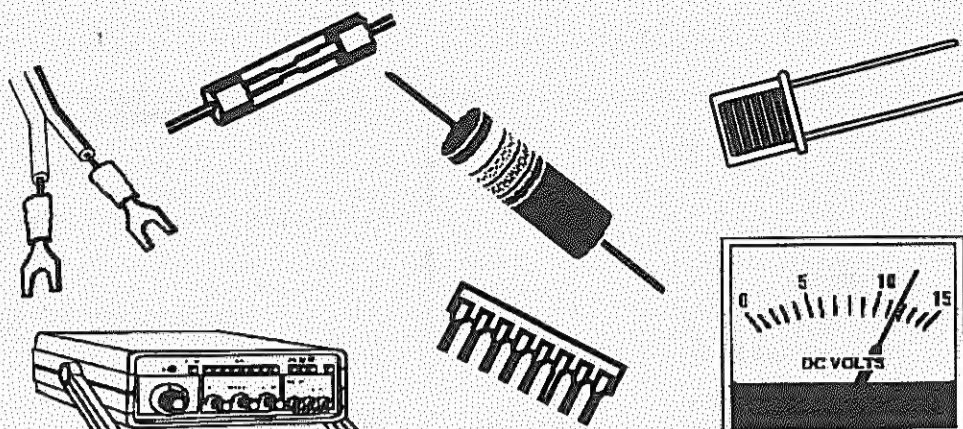
Consider Supporting the ARRL!!



In a recent poll, it was discovered that 282 MMRA members despise the "OVER" on the 146.61 autopatch.

To avoid this annoyance, especially during an emergency, please use the 449.925 patch codes when you are on '61 and want to make an phone call. This will work through the link and will activate the 449.925 autopatch which has no "OVER".

Speak out to the Repeater Trustees about this if you are one of those 282.



MMRA Kit Building Class

Have you ever wanted to build a fox hunting kit but:

- you thought a resistor was someone that burned their Draft card?
- you have a hard time remembering which end of a soldering iron to hold?
- your riding pants are at the cleaners and you don't want to get laughed out of the hunt club?

Well, never fear, the MMRA kit building class is here! In this class, we will:

- build the handi-finder kit.
- explain how the handi-finder works.
- teach proper kit building methods.
- explain what is fox (transmitter) hunting.
- show you how to fox hunt with the handi-finder.

At the end of the day, you will go home with a working handi-finder and the experience of using it.

The MMRA kit building class will take place at 10 AM on Saturday, April 16, 1994 on the grounds of Regis College in Weston. Talk in on 146.82. The course will cost 35\$ (prepay) and you will get a handi-finder kit and 4 hours of classroom instruction and kit building lab. Weather permitting, there will be an instructional foxhunt after the kits are built and tested. Class size is limited to 15 people so act fast to reserve your space. MMRA members will be given priority for class space.

Snip--Snip--Snip--Snip--Snip--Snip--Snip--Snip--Snip--Snip--Snip--Snip

Name: _____ Call: _____

MMRA Membership Number: _____ Address: _____

Phone Number: _____ Amount Enclosed (30\$ for kit, 35\$ for kit and class) \$ _____

If the class is overbooked, do you want a kit _____ or a refund _____

Signature _____

Note: Students will be required to sign a waiver of liability when they arrive at the class.

Students must provide their own tools (25w soldering iron, wire cutters and solder), 2m HT, and lunch. Students will be required to sign a waiver of liability when they arrive at the class.

For those of you that already know how to build kits, you can join in the foxhunting fun. Order your handi-finder kit through the MMRA for 30\$ and join us on our saturday afternoon foxhunt.

Kit or class, we must have your money by March 12, 1994. Make your check out to MMRA, fill in the application, and send your check+application to:

MMRA
PO Box 2282,
Lexington MA 02173

Checklist for class students:

- ___ 25w soldering iron
- ___ diagonal wire cutters
- ___ rosin core solder
- ___ 2m HT
- ___ lunch

Directions:

Take 128 to Route 20 west. Look for signs to Regis College and/or get direction via talk in on 146.82.

Questions:

call Eric Johansson, ka1eec, 508.667.0137. (7-9pm)

The Minuteman

Newsletter of the Minuteman Repeater Association - March/April 94
Volume 23 Number 4

MMRA Repeaters:

Weston	146.82	KA1AL/R	PTL	P
Marlboro	146.61	N1BHI/R	FTL	P
Marlboro	449.925	N1HBR/R	FTL	P
Stoneham	146.715	N1NVL/R	PTL	P
Quincy	146.67	KA1HKP/R	PTL	P
Quincy	224.40	KA1CLX/R	FTL	
Weston	224.70	N1HBR/R	FTL	
Hopkinton	223.94	N1BHI/R	FTL	
Stoneham	446.725	N1NVK/R	PTL	
FTL=Full Time Linked		PTL=Part Time Linked		P=Autopatch

MMRA Officers:

President:	Andy Morrison, N1BHI	508-481-3878
Vice President:	Walter Ching, N1HBR	508-481-0994
Secretary:	Frank Morrison, KB1FZ	508-443-6047
Treasurer:	Ian MacLennan, AF1R	617-449-1227
Clerk:	Al Williams, KA6BUV	508-369-0717
Directors:	Tom Qualtieri, WB1GMA	617-329-9151
	Chris Conti, N1NVL	508-489-1426
	Bob Levine, KD1GG	508-485-7006

Newsletter Editor:

Portable Equipment • On-Site Work
Stainless Steel • Aluminum
Plasma Cutting • Magnetic Drill Press



R F WELDING

Bob Feltmate
(617) 255-0411

P.O. Box 265
Westwood, MA 02090

Al Kunian, KA1AL
Mike Ryan, KD1OA

872-2912 (office)
(unlisted)

Important MMRA Club Information:

Membership Meetings: 3rd Tue of Sept, Nov, Jan, Mar, May at Campion Center, Weston at 7:30pm
Meeting Dates for 1993-94 Season: September 21, November 16, January 18, March 15, & May 17.
Board Meetings: 3rd Tue of Oct, Dec, Feb, Apr. Meetings are open and members are welcome.
If a visiting member wants to be on the agenda, please contact Andy Morrison beforehand.
Marlboro VE Sessions: Sat. Sept 11, Sat. October 9, Sat. November 13, Sat. December 11 (all 9am at the Marlboro Public Library)
1994: Sat. Jan 8, Sat. Feb 12, Sat. March 12, Sat. April 9, Sat. May 14, Sat. June 11.
Contact Bob KD1GG (508) 485-7006 for information and reservations
(508) 489-2282.

MMRA Voice Mailbox

Newsletter Information

Mailing Date

Submission Deadline

September issue

November issue

January Issue

March Issue

May issue

done!

done!

done!

done!

May 10

done!

done!

done!

done!

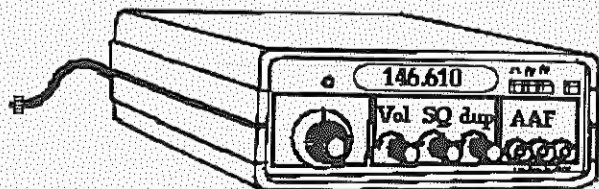
April 26<-ATTN MMRA OFFICERS

The MMRA is dedicated to Amateur Radio and the public service. The MMRA is a registered non-profit Massachusetts corporation. Membership is open to all amateurs. Annual dues are \$25.00 individual, \$35.00 family.

Mail Return Address:

MMRA
P.O. Box 2282
Lexington, MA 02173

TO:



First Class Mail